

EXPOSURE TO HERBICIDES IN HOUSE DUST AND RISK OF CHILDHOOD LEUKEMIA

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Background and Aims: Previous studies investigating the risk of childhood leukemia in relation to self-reported use of herbicides have produced mixed results. We measured herbicide concentrations in house dust—a reservoir for household chemicals—to estimate the association of childhood acute lymphoblastic leukemia (ALL) with exposure to these compounds.

Methods: A total of 269 ALL cases and 333 healthy controls (<8 years of age at diagnosis/reference date and residentially stable) from a case-control study in California (2001-2007) received a second interview with collection of carpet dust samples. Dust samples were obtained using a high-volume surface sampler or from the household vacuum cleaner. Herbicides were selected for analysis based on frequency of use in California and feasibility of laboratory quantification and included agricultural herbicides (alachlor, bromoxynil, simazine, and pendimethalin) and lawn and garden herbicides (trifluralin, MCPA, MCPP, 2,4-D, dacthal, and dicamba). Odds ratios (OR) and 95% confidence intervals (CI) were estimated using logistic regression. Models included log-transformed concentrations for herbicides detected in at least 50% of homes or binary variables (detect/non-detect) for herbicides detected in 5% to <50% of homes. All models included child's age, sex, race/ethnicity, household income, year and season of dust sampling, residence location (urban, suburban, rural), and residence type.

Results: Simazine, 2,4-D, and MCPP were the most prevalent herbicides (84%, 84%, and 73% detections, respectively). Dacthal was detected in 40% of case homes vs. 31% of control homes (OR=1.47, 95% CI 1.01, 2.14). Increasing dacthal concentrations were associated with a positive trend in risk among non-Hispanics but not other racial/ethnic groups. No other herbicides were associated with ALL risk.

Conclusions: In non-Hispanics, we observed increased risk of ALL associated with household exposure to dacthal, but no associations for other herbicides. A strength of this study is the use of household dust samples to estimate exposure to specific herbicides rather than self-reports.